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(54) Interconnection in semiconductor device and method of manufacturing the same

(57) Disclosed is a semiconductor device comprising a semiconductor substrate (1), an interlayer insulating film (4) formed on one main surface of the semiconductor substrate (1) and having a concave portion, a liner film (6) formed on the inner surface of the concave portion, a wiring layer (9) formed inside the concave portion with the liner film (6) interposed therebetween, and an agglomeration suppressing material contained in the wiring layer (9) for suppressing agglomeration of the material constituting the wiring layer (9). The agglomeration suppressing material is selected from the group consisting of O, N, Nb, Ta, Ti, W and C.

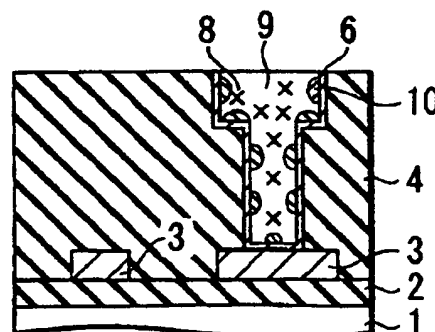


FIG. 1F

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EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 789 317 A (SANDHU GURTEJ ET AL) 4 August 1998 (1998-08-04) * abstract * * column 2, line 54 - line 33 * * column 6, line 24 - line 41; claim 12 * ---	1,2,4-7, 9-12,15, 16,18,19	H01L21/768
X	US 4 307 132 A (CHU WEI-KAN ET AL) 22 December 1981 (1981-12-22) * column 6, line 1 - line 32 * ---	1,2,4-7, 9,10, 12-16, 18,19	
X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 04, 30 April 1999 (1999-04-30) & JP 11 008304 A (NEC CORP), 12 January 1999 (1999-01-12) * abstract *	1-10	
A		12-19	
X	EP 0 788 145 A (APPLIED MATERIALS INC) 6 August 1997 (1997-08-06) * column 3, line 1 - line 7 * -----	1-6,12, 14-19	TECHNICAL FIELDS SEARCHED (Int.Cl.7) H01L
-The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 16 August 2000	Examiner Le Meur, M-A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document	

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-19



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**LACK OF UNITY OF INVENTION
SHEET B**

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-19

Metallisation of contact hole including :

- barrier layer
- first wiring layer including impurity which avoids agglomeration of the layer
- second wiring layer without impurity to fill the hole

2. Claims: 20-23

Metallisation of contact hole including :

- barrier layer
- first wiring layer without impurity
- second wiring layer with impurity